

Defensive Investment in Municipal Water Hardness Reduction

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BACKGROUND

Water hardness in municipal water supplies can cause negative economic and aesthetic damages to households and industry. These damages include decrease in the efficacy of the soap and cleaning products, shortened service lives of the household appliances, and increased distaste of drinking water. In this study, we measure the willingness to pay for reduction in water hardness by households for reasons other than perceived or true health risk, and the attributes that affect this willingness to pay. One issue of concern regarding water softening that is performed by homeowners is that the typical home water softening system is an ion exchange system. In an ion exchange system, calcium and magnesium cations in the water are exchanged for sodium cations; thus, the softened water has an equal amount of sodium ions as it had calcium and magnesium ions. This causes the resulting softened water to cause fewer economic and aesthetic damages to households, but it also causes the total amount of salts in the total water system to increase as more water is softened. By contrast, when water is softened at a centralized desalination plant, waste water that is high in salt concentration can be disposed of at a single location, rather than from dispersed households. Managing the total amount of salt in the system is less difficult at a point-source of salts than at many diffuse households. If households have a positive willingness to pay for softer water, this may lead municipal water utilities to invest in centralized desalination facilities, which would decrease the demand for household-level water softening.

FINDINGS AND BENEFITS

- Preliminary results indicate that households have a positive willingness to pay for softer supplies of municipal water
- These results can alter the benefit-cost analyses that municipal water utilities perform in determining capital outlays in desalination plants
- Future water supplies for municipal water will likely need to rely on water that has higher concentrations of salts, meaning that the management of salts in the system will become more important
- Forward looking water utilities that take household demand for water softness into account can more easily prepare for challenges of salt management